

THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

Paper No. 14

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte BARRY M. MILES, WILLIAM B. MULLEN, III,  
and GLENN E. GOLD

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Appeal No. 1998-3048  
Application 08/502,993<sup>1</sup>

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ON BRIEF

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Before SCHAFER, LEE and MEDLEY, Administrative Patent Judges.

LEE, Administrative Patent Judge.

**DECISION ON APPEAL**

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's rejection of appellants' claims 1-5. The real party in interest is Motorola, Inc.

**References relied on by the Examiner**

Shen Patent No. 5,384,689 January 24, 1995

**The Rejections on Appeal**

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<sup>1</sup> Application for patent filed July 17, 1995.

Claims 1-5 stand finally rejected under 35 U.S.C. § 102(a) as being anticipated by Shen. The appellants have grouped all five claims together for purposes of this appeal.

### **The Invention**

The claimed invention is directed to a leadless chip carrier. Independent claim 1 is reproduced below:

1. A leadless chip carrier package that does not have a die attach adhesive, comprising:

a printed circuit substrate having a die mounting area on a first side and having one or more vent openings located in the die mounting area, the vent openings extending through the substrate from the first side to a second opposing side, and the second side having a plurality of surface mount solder pads;

a semiconductor die disposed in the die mounting area and covering the vent openings, the semiconductor die electrically connected to the printed circuit substrate by at least one wirebond, and the semiconductor die lying directly on the substrate with no die attach adhesive between the die and the substrate; and

a plastic resin encapsulating the semiconductor die and providing a compressive force to secure the semiconductor die in direct and intimate contact with the printed circuit substrate die mounting area, the plastic resin further encapsulating the at least one wirebond and covering portions of the printed circuit substrate first side.

Claims 2-5 depend either directly or indirectly from claim 1.

**Opinion**

The rejection of claims 1-5 is reversed.

A reversal of the rejection on appeal should not be construed as an affirmative indication that the appellant's claims are patentable over prior art. We address only the positions and rationale as set forth by the examiner and on which the examiner's rejection of the claims on appeal is based.

Anticipation is established only when a single prior art reference discloses, either expressly or under the principles of inherency, each and every element of the claimed invention. In re Spada, 911 F.2d 705, 707, 15 USPQ2d 1655, 1657 (Fed. Cir. 1990); RCA Corp. v. Applied Digital Data Sys., Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed.Cir. 1984). See also In re King, 801 F.2d 1324, 1326, 231 USPQ 136, 138 (Fed. Cir. 1986); Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co., 730 F.2d 1452, 1458, 221 USPQ 481, 485 (Fed. Cir. 1984). The prior art reference must either expressly or inherently describe each and every limitation in a claim. Verdegaal Bros. v. Union Oil Co., 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir.), cert. denied, 484 U.S. 827 (1987).

The examiner has not established that Shen discloses a semiconductor die lying directly on the substrate with no die attach adhesive between the die and the substrate, as the appellants have claimed. According to the examiner, Shen discloses a die (80) "lying directly on a first side of a printed circuit substrate (60)" (answer at 3-4). However, Shen's die 80 does not "lie" on any substrate but is attached through its upper surface to the bottom surface of a first printed circuit board (60) and at its sides to the side walls of a second printed circuit board (70). See Shen's Figure 6. The appellants are correct that the bottom surface of Shen's die does not rest upon any supporting structure but is exposed. It is unreasonable, in light of the appellants' specification, and also contrary to conventional and ordinary understanding of the word "lying" to regard it as being met by attachment through the top or upper surface of an element. In short, Shen's die does not sit or rest on a substrate and therefore does not satisfy the limitation of lying directly on the substrate.

Even assuming that Shen discloses a die (80) lying directly on the substrate, the examiner has not demonstrated

that Shen's disclosed structure is without "die attach" adhesive between the die and the substrate, as the appellants have claimed. No explanation has been provided by the examiner as to how the die element (80) in Shen is attached to the first or second printed circuit boards.

The appellants' claims also call for:

a plastic resin encapsulating the semiconductor die and providing a compressive force to secure the semiconductor die in direct and intimate contact with the printed circuit substrate die mounting area, the plastic resin further encapsulating the at least one wirebond and covering portions of the printed circuit substrate first side.

The appellants argue that if anything, the die (80) in Shen is secured by an adhesive force provided via the epoxy resin filling the bore hole 61, which is not a compressive force as is claimed by the appellants. The appellants further note that a compressive force would tend to dislodge Shen's die which has no support on its bottom surface. The examiner has not provided any satisfactory explanation or response to these valid points. In that regard, the examiner states (answer at 4-5):

A recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the claimed structural

limitations. Therefore, from Appellant's admissions, it appears that the "adhesive force" of Shen is equivalent with the "compressive force" in the claim.

The examiner's stated position is without merit. The issue here does not concern a manner of use of a claimed apparatus and that of a prior art device having the same structure, but structural differences between the claimed apparatus and the prior art device. In the claimed invention, the die has to be secured to the printed circuit substrate by way of a compressive force stemming from an encapsulating epoxy resin. That limitation is not met by having an adhesive between the die and the substrate. Moreover, the preamble of claim 1 specifies that the package has no die attach adhesive, and the body of independent claim 1 specifies a die "lying directly on the substrate with no die adhesive between the die and the substrate" (Emphasis added). At least in the context of the appellants' claims, the examiner erred in finding that a compressive force and an adhesive force are equivalents.

For the foregoing reasons, the rejection of claims 1-5 cannot be sustained. We express no opinion on any other argument presented by the appellants in their brief.

Appeal No. 1998-3048  
Application 08/502,993

Conclusion

The rejection of claims 1-5 under 35 U.S.C. § 102(a) as being anticipated by Shen is reversed.

**REVERSED**

RICHARD E. SCHAFER                    )  
Administrative Patent Judge        )

Appeal No. 1998-3048  
Application 08/502,993

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SALLY C. MEDLEY	)	
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